

METHODS OF MINING

How Goldseekers Get the Metal Out of the Earth.

Working With Sluices—Hydraulic Diggings. Conditions of Mining in Alaska, California and Australia—Primitive Vein Mining. Treatment with Chemicals.

By KARL MCLEERY.

PART II.

The third step in advance in mining is the use of a sluice. A sluice is a trough made of three planks nailed together. Towards one end it has a slight taper to permit its insertion into another "box." Any number of these boxes may be placed together, and in the large hydraulic workings the total length may be several miles. Every portion catches some gold, but 99 per cent. are found in the first 100 feet.

Across the bottom of the sluices are placed riffles, just as in the cradle. In large sluices the bottom is paved with lowriders laid together or with blocks of wood. In operation the sluice is shoveled into the upper end, a stream of water being made to flow through. Sand and stones go down stream while the gold sinks behind the riffles or into the sand between the lowriders of the pavement. In working with sluices mercury is generally poured into the upper end from time to time, the idea being that it wets the fine gold and clings to it, the two together forming an agglomerate too heavy to be transported by the water.

In the great hydraulic diggings of California the dirt is mined and washed with the same water, a stream under heavy pressure being directed against a bank until it

the first, since the heavy stones being gotten rid of, not much fall is necessary to keep the material moving. The finer gold is thereby given a chance to settle. After an interval comes another grizzly, the bars being placed closer together than those of the first; and so on, till the stuff remaining is all sand.

From time to time a clean-up is made. The pavement of the top boxes is removed and the sand taken out and washed in a special short sluice, or where its richness warrants it, panned. Water is usually kept running through the sluice at night to prevent unlawful clean-ups.

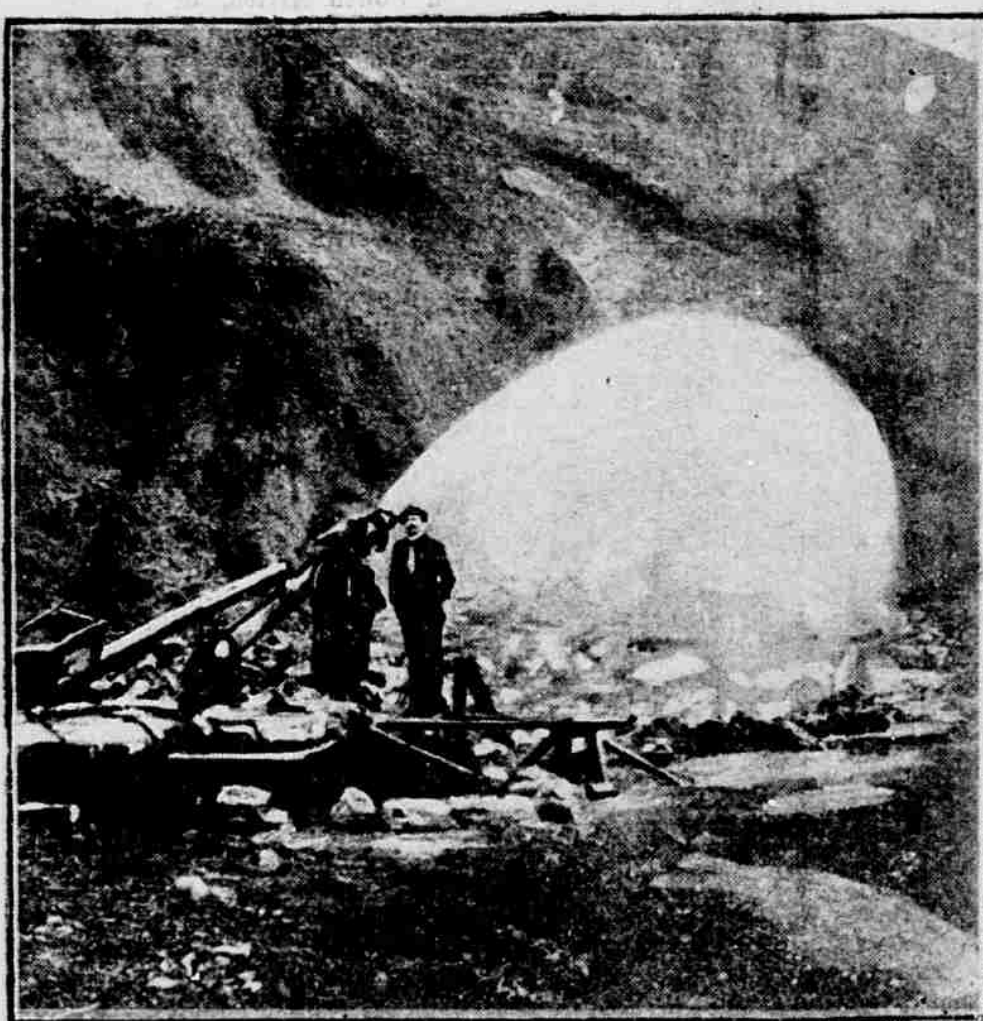
A convenient method of handling large quantities of dirt is what is called ground-sluicing. A creek is dammed and a stream of water turned over the dirt to be washed. Men stir the bottom up with picks and when it has excavated itself a channel with their assistance as low as it is possible or desirable to go, the banks are tumbled in till as much dirt as possible has been sent down stream. The sand and stuff remaining in the bed of the artificial stream are then panned. Where it is possible this is a very good method in primitive mining. It is very wasteful, but very cheap.

In Alaska, owing to the peculiar conditions of climate, a new method of treatment has been evolved. As the ground is frozen most of the time, ordinary methods of sluicing will not answer. During the winter shafts are sunk through the gravel until bed-rock is reached. The method of penetrating the frozen ground is primitive but effective. Fires are built on the ground, and when thawed out a few feet the dirt is removed with pick and shovel. When bed rock is reached, "drifts" (tunnels) are driven in all directions, the same procedure of alternate thawing and picking being followed. The dirt removed is piled and when summer comes it is washed in short sluices. By this method of working the expense and trouble of handling the more or less barren material near the surface is avoided.

feet square, the ends being mortised. The timbers are placed at intervals of five or six feet. It is understood of course that these "sets," as they are called, are horizontal. Small poles or boards, when they are cheap, are driven back of these sets next the dirt wall, extending from one set to the next below.

The same method of timbering is used in shafts sunk in vein mining. In primitive vein mining where the "quartz" (the uni-

weight. Broken ore is dropped into the back of the mortar, together with a thin stream of water. As the ore is crushed into a slime by the dropping of the stamps it is splashed through the screen, and runs off, together with the water, across an inclined copper plate, the top of which has been silvered and then amalgamated with mercury. Mercury is kept in the mortar and retains the coarse gold there while the finer gold and mercury slime are caught and retained



HYDRAULIC MINING.

versal Western term for any auriferous vein matter) is rich enough it is worked up in an arrastra. This is a Mexican machine, and although slow and cumbersome, it saves a greater percentage of gold than many modern and more pretentious machines. It is made by constructing a round enclosure with walls of stone or board. In the center is an upright shaft. The bottom is paved with heavy stones. From the shaft extends a horizontal arm, to which is secured a large fragment of rock by rings and chain. It is so attached that as shaft and arm rotate the stone is dragged in a circular path over the bottom. To the outer end of the arm is hitched a horse.

The ore, broken up by the hand to the size of a walnut or a baseball, is thrown into the arrastra, a pound or two of mercury added, and the horse started. When the material is reduced to slime and sand, water is added, and the mass stirred up to make the amalgam settle. The top stuff is then taken off and the bottom material panned. Of course, several charges may be worked before a clean-up is made. The amalgam, finally separated by panning, is squeezed through a chamois-skin bag and the mercury evaporated used over again, while the solid amalgam remaining in the bag is placed in a retort and the mercury distilled off, leaving impure gold behind. The retort is made of one of the iron bottles in which the mercury is bought, a piece of gas-pipe being tapped into the neck.

Only "free-milling" ores are suitable for the arrastra; that is, ores in which most of the gold can be recovered by simply crushing and panning. Where an ore contains pyrites or changes materially in burning it is not free-milling, and must be treated by modern processes.

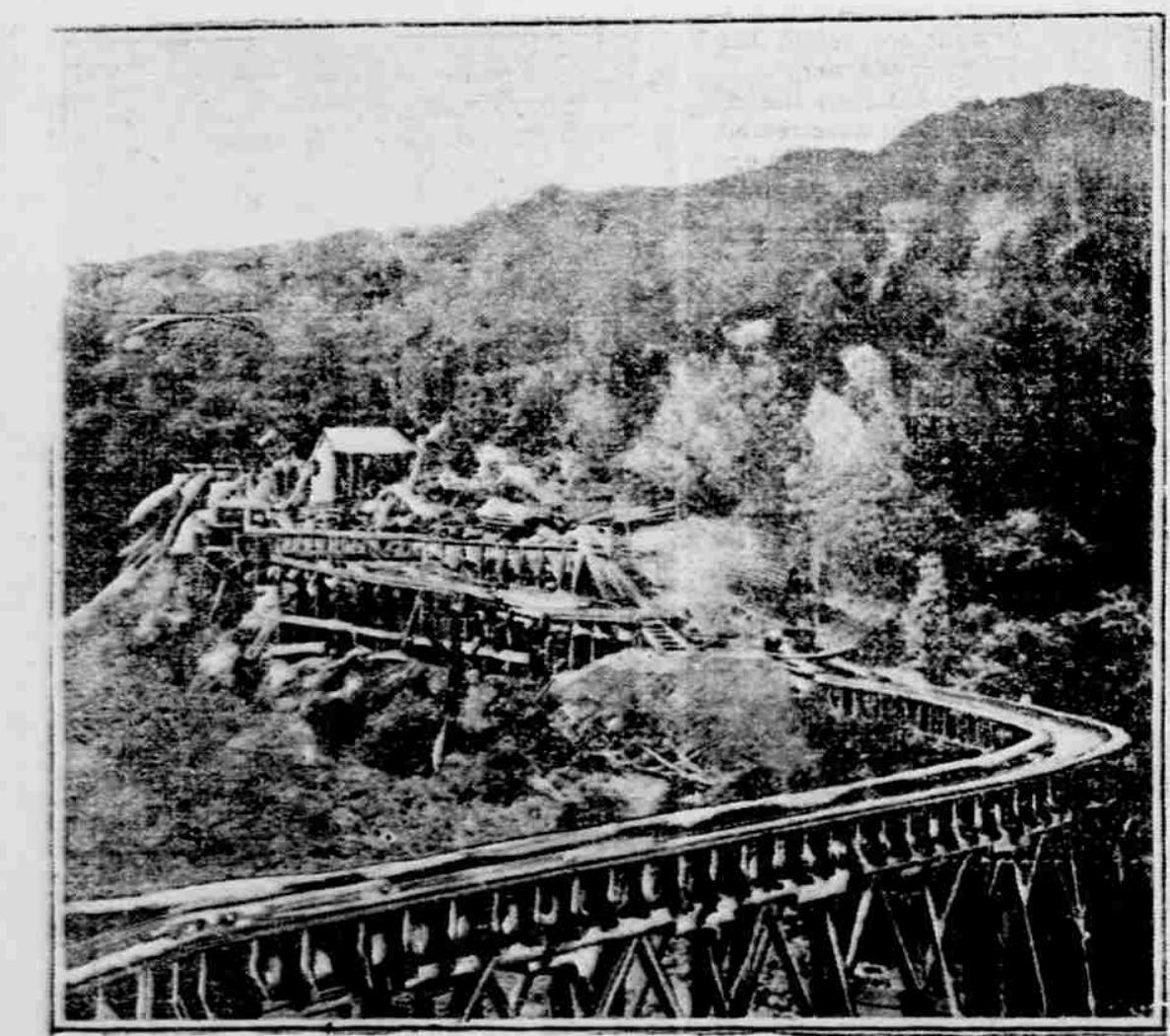
The stamp-mill is the usual method for treating free-milling ores. A stamp-mill consists of a series of iron mortars placed in a row. The front is cut down and provided with a sieve arrangement. Into the mortar drops a heavy stamp-shoe to pulverize the ore. The shoe is lifted by a slender rod which engages with a cam-wheel and is lifted by power, and allowed to drop of its own

weight. Broken ore is dropped into the back of the mortar, together with a thin stream of water. As the ore is crushed into a slime by the dropping of the stamps it is splashed through the screen, and runs off, together with the water, across an inclined copper plate, the top of which has been silvered and then amalgamated with mercury. Mercury is kept in the mortar and retains the coarse gold there while the finer gold and mercury slime are caught and retained

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SLUICE CONSTRUCTED ON A CREEK.

carves in and all washes down into the sluice. Where this is done long sluices are used and "grizzlies" are inserted. At intervals where a ravine gives favorable opportunity, the line of sluice is interrupted, and in its place is put a grating of heavy iron bars in line with the floor of the sluice. This is the grizzly. The mixture of water, stones and sand comes tumbling down the sluice, and the stones are intercepted and thrown off into the ravine, while water and fine stuff drop through the bars into another sluice going off at an angle to the first.

This second sluice is given less grade than

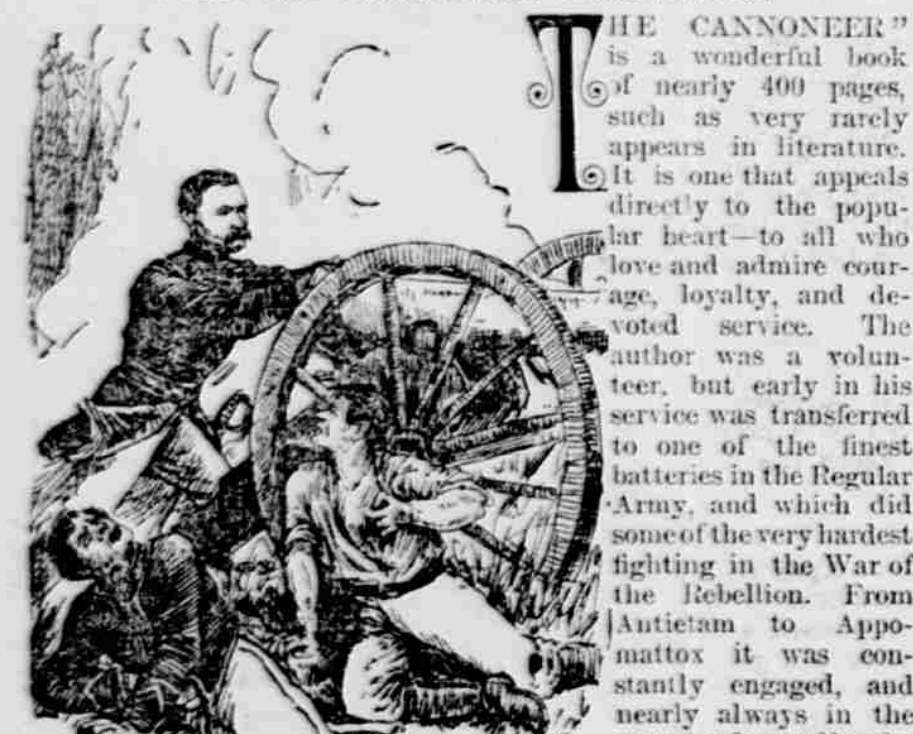
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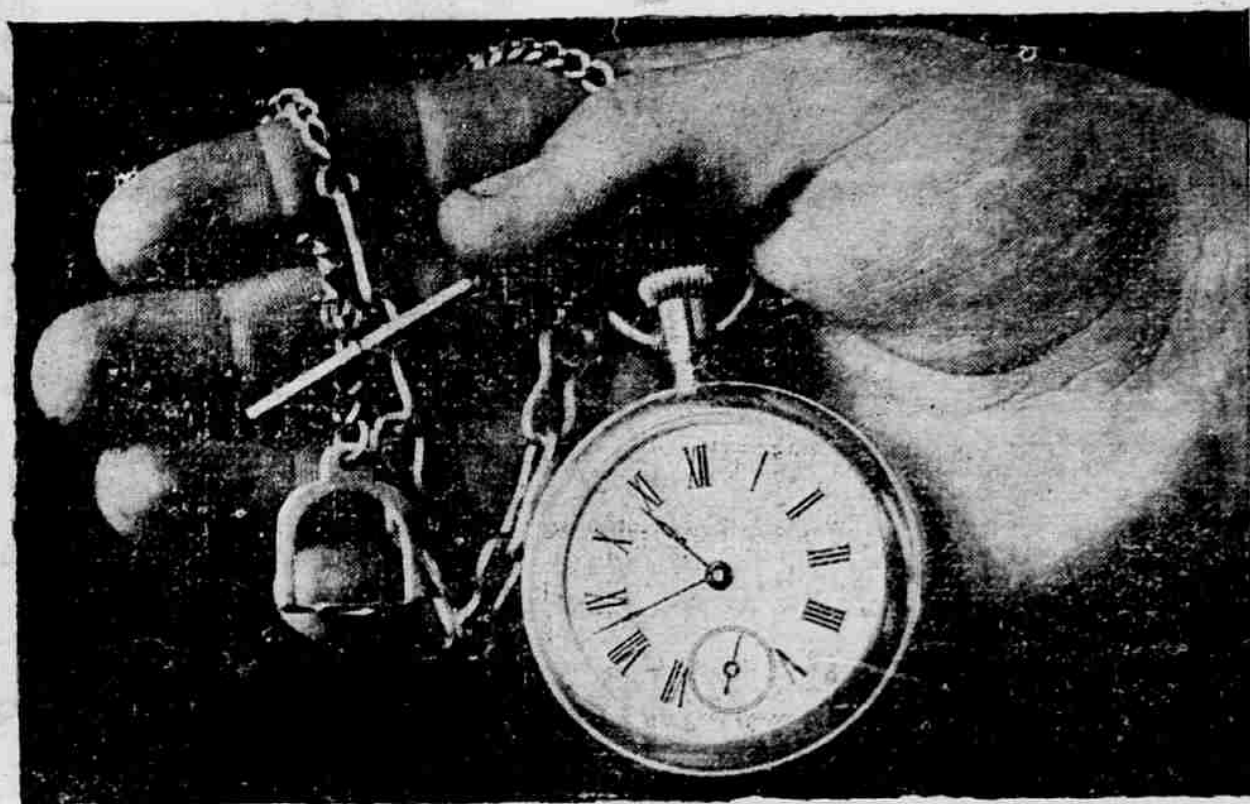
Three events narrated in the story of this expedition are unparalleled either in ancient or modern warfare. No writer of romance would dare to invent the capture of a crowded railroad train in the midst of an enemy's camp by a band of twenty unarmed soldiers who had journeyed hundreds of miles from their own lines. The subsequent escape of part of the same band by seizing an armed guard almost in sight of a regiment of foes, and stealthily crossing the whole breadth of the Confederacy in different directions, is equally marvelous; while the sad tragedy that occurred at Atlanta is freshly and vividly remembered by the inhabitants of that beautiful city after the lapse of more than thirty years. The claims of this whole "Railroad Adventure" to be regarded as the most remarkable episode of the civil war has never been disputed.

TABLE OF CONTENTS.

- Chapter I. A Secret Military Expedition. II. Midnight Consultation. III. Companions and Incidents. IV. A Locomotive and Train Captured. V. Unforeseen Hindrances. VI. A Terrible Railroad Chase. VII. A Night in the Woods. VIII. In the Enemy's Power. IX. Other Captures. X. A Horrible Prison. XI. Lights and Shadows of Prison. XII. The First Tragedy. XIII. A Confederate Court-Martial. XIV. The Crowning Honor. XV. Prison Religion. XVI. Liberty or Death. XVII. Romantic Escapes. XVIII. From Atlanta to the Gulf. XIX. From Atlanta to Richmond. XX. Libby and Castle Thunder. XXI. Sickness and Liberty.

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of only four subscribers at \$1 each for the best family newspaper in the United States. See "Club-Raising Made Easy" in another column on this page.

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It Pleases a New Yorker.

NEW YORK CITY, N. Y., April 2, 1897.
Publishers NATIONAL TRIBUNE:
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With best wishes for your future success, I am, very respectfully,
JOS. SWIFT.

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S. P. BECK.

LADIES' AID SOCIETY.

Annual Convention of the Auxiliary to the Sons.

The Indianapolis Convention of Ladies' Aid Society was held for three days. Miss Anna Sims, President of the Indiana Division, on behalf of the state, and Miss Addie Wallace, on behalf of the city, welcomed the guests. National President Raynor responded. National President Raynor read her annual report. The National Secretary, Mrs. M. E. Baldwin, reported a balance in the treasury of \$244.85. She reported the number in good standing at the present time is: Societies, 202; members, 5,000; a gain of 13 Societies and 650 members in the year.

The Committees on Ritual and Rules and Regulations recommended that a committee be appointed to revise the Ritual and Regulations during the coming year and report at the next Convention. This recommendation was adopted.

After a close contest Miss Kate C. Raynor was re-elected President, the other candidates being Mrs. E. H. Davis, of Washington, D. C. Other officers: V. P., Miss Addie Wallace, Indiana; Chap., Mrs. Mary Homsher, Illinois; Treas., Mrs. Lydia Turner, New York; Ins., Mrs. Emma Schuler, Louisville, Ky.; Mastering and Installing Officer, Mrs. Sarah Lyon, Minnesota. National Council, Mrs. Mary L. Warren, Wakefield, Mass.; Mrs. Mamie Dorsey, Maryland, and Mrs. Elizabeth Herr, Lancaster, Pa.

SIEGE OF CHARLESTON.

An 11th Mo. Man Tells What He Knows About It.

EDITOR NATIONAL TRIBUNE: Comrade George Barber, Co. G, 112th N. Y., in his article, "Bombarding Rebel Strongholds," says that on the extreme end of Cummings Point was situated Fort Wagner. This is a mistake. The point mentioned was Fort Gregg. Fort Wagner was at least one-half mile down the island, on a narrow neck situated fronting the ocean, and only a sand-beach between the water and its ramparts of sand. To the rear of the fort a marsh extended, through which a creek ran to the rear of what we called the water battery a part of Fort Wagner.

After our forces had driven the rebels off Morris Island, the forts were remodeled to suit the situation, and Fort Gillmore, which contained one 300-rifle Parrott gun and one

200 and one 100-pound gun of the same make and a mortar battery, was built afterwards. It was constructed under fire of the rebel forts. Gregg was about 1,000 feet to the left of Gillmore, facing James Island, on which were the rebel forts, Citizens' Battery and Fort Johnson. Gillmore was to the right, facing Fort Moultrie, across the bay, on Sullivan's Island. Its other front was exposed to the fire of the guns of Battery B and Castle Pinckney and Fort Sumter. At the time Charleston was fired on by B. Terry Gregg consisted of two 10-inch Columbiads and a water battery of six 32-rifle Parrott guns, a detachment from my regiment (the 11th Mo.) under Capt. Selmer, and the celebrated Swamp Angel.

A common practice among our artillerymen was the knocking down of the flag-staff on Moultrie. But the slickest job by our artillery was sinking a Johnny Bull, blockade-runner on the night of Feb. 2. She had run through our fleet, it being a foggy night, but was discovered by our boys and sunk.

Fort Gillmore was sometimes called Battery Chaffin, and Fort Wagner was called Fort Strong, after the death of that gallant officer—Wm. H. DOUGHTY, Co. F, 11th Mo., Orr's Island, Me.

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Boy's Winter Suit, 8 to 14 years,	-	-	" 10
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Silk Umbrella	-	-	" 10
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We know how highly you esteem THE NATIONAL TRIBUNE and how you work for it, keeping it ahead of most all other weekly papers in point of circulation. We know, too, how surprised some of you are, at times, to run across people who do not fully appreciate THE TRIBUNE—who, indeed, are inclined to dispute your statement that it is the best paper on the face of the earth.

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Now this situation suggests a remedy: Why not offer subscribers such big inducements that the club-raiser will succeed with every person solicited?

With this end in view we have made the offer you will see elsewhere on this page of giving two large books, "The Cannoneer" and "Capturing a Locomotive," to everyone who subscribes during the month of September.

We intend, also, to send these two books with every premium sent to a club-raiser. That is, in addition to the premium he works for and earns, whether it be large or small, we will send these two books as a present. We never forget old friends when cutting a watermelon.

Surely this makes club-raising easy. All you have to do with persons solicited to subscribe is to show them the paper and its attractions, describe the free books (or let them read about them in the paper), and take their dollars. Remit the dollars, with their full addresses, to us, and we will do the rest: that is, we will send to each address the two books at once and the paper for a year, and to you we will send the books also, and the premiums, all postpaid.

All comrades who are at present working for clubs may offer these two books to each subscriber. This enables them to promptly complete the clubs they are working for, however large.

Comrades, just try for clubs now. You will surely succeed.